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Two-dimensional plasmon polariton nanooptics by imaging in far-field

Stepanov A., Krenn J.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

A review of the experimental realization of key high efficiency two-dimensional optical elements, built up from metal nanostructures, such as nanoparticles and nanowires to manipulate plasmon polaritons propagating on metal surfaces is reported. Beamsplitters, Bragg mirrors and interferometers designed and produced by elelectronbeam lithography are investigated. The plasmon field profiles are imaged in the optical far-field by leakage radiation microscopy or by detecting the fluorescence of an organic film deposited on the metal structures. It is demonstrated that these optical far-field methods are effectively suited for direct observation and quantitative analysis of plasmon polariton wave propagation and interaction with nanostructures on thin metal films. Several examples of two-dimensional nanooptical devices fabricated and studied in recent years are presented.